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AUTHOR Johnston, Holly R.
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ABSTRACT

Exploring the class-size issue, this paper focuses on the primary grades and asks questions such as "does a reduction in class size promote an increase in academic achievement?" and "how substantial does the reduction in numbers have to be in order for a significant increase to occur?" The paper surveys debates on class size and the social factors that surrounded these debates. It outlines the results of class-size research and discusses what are considered optimum class sizes. Ways to capitalize on smaller class size are detailed, along with the issues surrounding research on class size. The paper suggests that reducing class size should be matched with a change in teacher behavior and that teachers should receive extensive and continuous training to alter their teaching strategies. The paper concludes that a reduction in class size at the earliest grades offers significant advantages not only in achievement results, but also in other important outcomes. Smaller classes build a sense of belonging in students, enabling them to increase in self-esteem and achievement. It is recommended that future studies on class size should examine the longevity of effects of reducing class size in order to guard against the effects of novelty and other influences. (Contains 47 references.) (RJM)

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CLASS SIZE

by

Holly R. Johnston

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Chapter I

INTRODUCTION

Class size, an issue that has been around for decades, continues to be one of the most hotly debated topics in education. Depending upon your perspective, goal, or indices of measure, you can make the results indicate an advantage to reduced class size or no significant effect. If the results of class size are narrowed down to a simple measure of test scores, the results may at times seem hardly worth the cost. However, if a myriad of outcomes are evaluated (such as teacher attitudes, student attitudes, self-concept, attendance, social interaction) the results seem clear. Reduced class size has a significant impact on educational outcomes. Particularly important is concentrating class size efforts at the earliest levels of school, where the effect is most significant. Since education in today's society involves much more than high test scores, evaluation of class size should be broadened to include those measures of school success that really matter.

The complexity of the issue is unfortunately lost when achievement results become the primary focus (Smith & Glass, 1980). The history of class size research reveals a richness of different perspectives and problems relating

to the issue (Ryan & Greenfield, 1975). For example, the research has often had an unfortunate history of inconclusiveness that has failed to provide the answers desperately needed for guiding policy decisions (Blatchford & Mortimore, 1994). Often it has simply led to more confusion and questions. Policy issues influenced by benefit/cost factors, public opinions, and educators' views have all surrounded these tenuous research results. People involved in the class size debate often have had conflicting interests resulting from different perspectives and goals (Blatchford & Mortimore, 1994). Human development theories and social forces have added insight. The influence of societal pressures for greater efficiency during one period in history and greater focus on the individual during another period has led to different focuses in policy (Mitchell & Beach, 1990). Understanding about the impact of class size has been further clouded by the intervening influence of variables, such as classroom characteristics, student characteristics, teacher ability, instructional methods, and other factors (Bourke, 1986). This has, in turn, prompted a focus on examining alternatives to achieving a lower pupil/teacher ratio and recommendations for capitalizing on smaller class sizes (Folger, 1989). Rather than being the simplified issue that it is currently portrayed as, class size is actually an issue accompanied by a host of other questions and issues (Blatchford & Mortimore, 1994). This paper will be used to explore the

many dimensions of the class size issue as a way of demonstrating the complex nature that needs to be considered in making decisions.

When the issue is brought down to even a simplified level--the classroom--the complexity of its influences is revealed. When I think of my own classroom, I can think of several ways that changes in class size have an impact on teaching. For example, in the area of teaching strategies, I often make decisions about what will be instructionally feasible based on the possibilities/limits of different sized groups. Issues such as needed space, available materials, cost, and the potential for management difficulties may influence instructional choices. I will tend to take more risks and try new techniques when the classes are smaller. I have different attitudes about smaller class sizes. I often have more positive expectations for learning outcomes with children in a group that is smaller, just due to the likelihood of my ability to give each student more individual attention. I can provide for my students' social/emotional needs better with fewer students. I can get to know my students and their learning styles better, and as a result gear instruction to meet their needs better. For me, teacher sanity is more likely with fewer students. My ability to expend more energy in the class each day improves. This improved attitude ultimately influences student achievement.

My experiences over the past few years with fluctuations in class size have provided me with a deep desire to pursue an exploration of the effects of

class size. Certainly as a teacher I know just how different experiences with a class of 30 can be in comparison to experiences with a class of 17. I have had some experience with both extremes. I received my current kindergarten position due to the state's commitment to reducing class size in kindergarten. The state legislature apparently felt convinced of the importance of reduced class sizes and the resultant effect on achievement to fund ratios of 1:17 in kindergarten classrooms. Our district immediately used the money to hire extra teachers for the purpose of creating "authentic" 1:17 teacher/student ratios. When I say authentic, I mean that the ratio was not achieved through adult/pupil numbers as would be the case with aides. At the time I was not aware of how truly unique and wonderful my first teaching experience was going to be. It gave me a chance to really get to know the kindergarten curriculum and my students and to try out a variety of instructional techniques that I perhaps would not have tried otherwise. I must have really bonded with these students because to this day these same students come back to visit me the most. I am convinced it was in large part due to my ability to bond with each student in a small class.

The next year, due to population increases throughout the district, our class size numbers grew to around 22. Since we were still receiving state money, we were allotted some aide time. However, I discovered how difficult it was to find time to train an aide on the use of instructional methods. She came

in when the children did and left when they did, splitting her time between two classes. It seemed that she was just another person to manage, and as an inexperienced teacher I was not using her most effectively. Larger class sizes meant that the whole group dynamic had changed. As the teacher, I had ultimate responsibility, only now the number of students to be monitored, assisted, and cared for had grown. I could sense a difference in the quality and quantity of social interaction I had with my students, despite a mere addition of about five students.

I was not aware that the next year would provide an even greater host of problems in terms of group dynamics. By my third year, the legislature was no longer funding smaller class sizes, and it was up to individual districts to continue funding the 1:17. Fortunately, St. Paul decided to allocate some additional money to keeping numbers low. However, due to surging populations and a lack of space, the district became quite creative with how they achieved that 1:17 ratio. Aide time became the hottest strategy. As numbers continued to soar, a teacher would receive more aide time. I averaged about 25 students in my third year, but as I would soon find out, this year would be like no other. In addition to having more students, I experienced a whole host of other problems--many of which were most definitely exacerbated by larger class size. The students in my third year of teaching brought with them a wide variety of emotional and behavioral needs. With

larger classes, I experienced difficulty in attempting to meet their needs and ultimately managing the class. When I was unable to meet their needs, they acted out in negative ways in desperate cries for attention. As behavior problems increased, time on task and achievement decreased. A cycle became established as their misbehavior affected my attitude, which in turn contributed to their misbehavior. Needless to say, a mere handful of these students would have been sufficient in keeping me busy. I did not have the time, energy, or patience to adequately meet their needs. Increased class size had become a significant factor in student achievement, unmet social/emotional needs, classroom management, and teacher sanity.

In my fourth year of teaching I was fortunate to have a wonderful group of students. However, this year also had its dilemmas. Enrollment soared past earlier predictions, and by the end of the first month we had 34 students in a class. Anyone who has taught in the primary grades knows that this number is intolerable, but it is particularly the case in kindergarten. Kindergarten is a time when teachers play a critical role in orienting students to the school environment, bridging the home to school gap, helping meet student social/emotional needs, and basically helping provide students with a solid foundation upon which to promote further learning. Due to different family backgrounds and prior learning experiences, the kindergarten classroom can be an environment that brings together a group of diverse individuals. As a

teacher with 34 (68, if you consider the double sessions a kindergarten teacher has in our district), frustration became imminent as I was unable to adequately meet the academic or social needs of my students. This group thrived on individual attention, but I could sense on their faces that I was not reaching them sufficiently. While students were learning, I was unable to devote enough time to challenging high students or helping lower ability students. Managing the flow of instruction and movement of students from one activity to the next became a big issue. Teacher sanity became a growing problem as days became weeks and the strain became wearing. I was losing all of my energy just attempting to keep up with everything and do even normal activities.

As a direct result of these varying experiences with class size I became intrigued with what the research had to say about the effects of different class sizes on achievement and, perhaps more importantly, nonacademic (social/emotional) results. While I had some deep feelings about the importance of smaller class sizes, I wanted to see what research would have to say about it. Also, because I am a kindergarten teacher and felt sure that there would be strong effects on social/emotional aspects of the classroom for the primary level, I decided to narrow my focus to research pertaining to the primary grades. Convinced that there would be strong support for reduced class sizes from a human development perspective, I decided to pursue what research would say about this angle. With this as my narrowed focus, I was

able to formulate several key questions to guide my search: Does a reduction in class size promote an increase in academic achievement? How substantial does the reduction in numbers have to be in order for a significant increase to occur? What nonacademic gains are made as a result of reduced class size? What age level of students are most affected by a reduction in class size? Do children of poverty benefit from reduced class size? As I began my investigation I was quite sure that research would indicate significant gains for students academically and socially by a reduction in class size. From experience, I felt sure that the gains would be most significant for the lower grades where individualized attention is so important. As I would soon discover, class size is an issue that can be multifaceted in complexity and provide results that appear anything but straightforward.

Chapter II

REVIEW OF LITERATURE

History of Class Size

Research on class size has had a rather long and unfortunate history. The literature has often aimed more at convincing than informing (Mitchell & Beach, 1990). Researcher bias and perspective have also largely influenced the results and the interpretation of those results. Discussions about the importance of class size originated in the 17th century when Comenius and Locke expressed different opinions about the subject (Ryan & Greenfield, 1975). Interest in conducting research on the topic began around 1909 with a study done by Rice. The study aimed at applying efficiency models borrowed from private industry to school programs. The major conclusion reached was that there were no effects resulting from reduced class size (Bracey, 1990). Research conducted prior to 1920 dealt primarily with the effects of large classes on grade-to-grade promotion rates.

During the 1920s, focus shifted to how class size affected individual student achievement (Mitchell & Beach, 1990). Researchers began employing newly developed intelligence and achievement tests and better experimental

controls in their research designs (Mitchell, 1989). However, Mitchell (1990) found in his review of the research that the results were inconsistent. By 1930, fully randomized research designs were being utilized. Researchers were interested in how large classes could become before causing injury to the educational rights of individual children (Mitchell, 1989).

After World War II, attention focused on whether increasing class size to accommodate expanding enrollment interfered with student achievement (Mitchell & Beach, 1990). Administrators focused attention on just how large classes could become without causing significant losses in student achievement. By the late 1960s, emphasis shifted toward documenting the benefits of small group instruction and assessing the benefits for disadvantaged students (Mitchell & Beach, 1990).

Interpretation of the growing body of research took a giant leap forward in 1978 with a meta-analysis conducted by Glass and Smith. Glass and Smith found that achievement dropped off sharply when additional students were added to very small classes, but the marginal effects of each additional student decreased as classes got larger. Disagreements about the magnitude of student achievement gains and the classroom processes by which they are produced continue (Mitchell & Beach, 1990).

Research on the effects of reduced class size has often been characterized by one word--"inconclusive" (Smith & Glass, 1980). A vast

majority of the research reviewed indicated that research appeared inconclusive because some studies favored smaller classes, others favored larger classes, and some indicated no relationship between the two (Smith & Glass, 1980). Since higher achievement is the measuring stick usually used by policy makers, one must demonstrate "scientifically" that decreasing class size has social utility-- that it produces increased achievement at a reasonable cost (Smith & Glass, 1980). Until recently literature reviewers had largely concluded that the class size evidence was inconclusive relative to academic benefits. Only recent studies such as the STAR study and PRIME TIME study have produced a more promising look at the possibility of academic benefits (Achilles, Finn, & Bain, 1997). Inconsistent findings often resulted from a lack of experimental control and diverse definitions of "large" and "small" classes (McGiverin, Gilman, & Tillitski, 1989). When pupil-teacher ratios are used as the measure, the complex interrelationship among classroom variables and achievement outcomes may be obscured. Many reviewers would instead advocate a research emphasis on more qualitative classroom changes (actual amount of teacher-student interaction, reduction in disciplinary problems, better use of space, and ability to use a wider variety of instructional methods) that might be evoked by shifts in class size, rather than on the specific numbers of students and achievement measures (McGiverin et al., 1989). One of the biggest puzzles in the class size research has been its inability to verify the

seemingly common sense assumption that smaller class sizes in schools will lead to educational benefits for pupils (Blatchford & Mortimore, 1994). This puzzle has led to a good deal of speculation and has contributed to a lack of clear policies on class size. Very different conclusions have been drawn from sometimes the same research evidence (Blatchford & Mortimore, 1994).

Inconclusive results can be attributed to various problems with the research, how it is conducted, and a lack of control over confounding variables (Ryan & Greenfield, 1975). Ryan and Greenfield (1975) found that a problem of quality, a problem of definition, and a problem of influencing variables all led to inconclusive research results. In terms of quality, half of the evidence supporting small classes resulted from measures of opinion, and the remaining studies were almost equally divided between support and lack of support for small classes (Ryan & Greenfield, 1975). The research designs, procedures followed, criterion measures used, and statistical analyses employed were subject to question (Ryan & Greenfield, 1975).

The problem of definition refers to a lack of common definitions of large and small classes. Large and small classes are matters of relativity or degree (Ryan & Greenfield, 1975). The number for what is considered large and small has changed over the years. The number has decreased historically as teachers found fewer students in their rooms. This number also has varied with conditions, such as grade level and subject matter. Researchers cannot

manipulate class sizes to fit definitions, so numbers are relative (Ryan & Greenfield, 1975).

Considering the problem of influencing variables, it has been said that in no existing study of class size have all the contributing effects been examined or controlled (Ryan & Greenfield, 1975). Variables such as the nature of the pupils, the personality of the teachers, the subject matter, and the methods of instruction can be more important than class size. These are often left uncontrolled and thus have contributed to the difficulty of assessing the class size effect itself (Ryan & Greenfield, 1975). Teacher workload--the total number of students a teacher is responsible for--is also omitted and may be more significant than the number at any one time (Ryan & Greenfield, 1975). Although class size is a multivariate problem, most class size research conducted to date has tended to use a single variable approach. The use of only one criterion measure for class size effects, namely student achievement test scores, has also been the subject of criticism (Ryan & Greenfield, 1975). The commonly used norm-referenced achievement tests have been seriously criticized because they are designed not to measure what all students have learned, but rather to distinguish between students (Ryan & Greenfield, 1975). Often the student's mastery of factual material is the only aspect measured, to the neglect of other higher level understandings or the development of important creative and social skills. On the other hand, measuring the effects

of class size through observation and inventory of educational processes is similarly difficult because objectivity may be lacking and comparisons extremely difficult (Ryan & Greenfield, 1975).

Mitchell (1989) discovered that the literature was filled with controversy. He proposed that three factors were responsible for the divergent and conflicting views--researcher motivation, the effect of confounding variables, and problems related to distinguishing between student achievement and other classroom process changes.

Major class size research studies have been prompted by very different motives and have sought to answer very different questions (Mitchell, 1989). Concern with economic efficiency prompted the earliest studies. Later research was more concerned with individual student achievement and sought to determine how class size would optimize learning (Mitchell, 1989). As stated earlier, class size is but one of many variables that influence the behaviors of students and teachers, and the effects of class size are easily confounded by these other school factors (Mitchell, 1989). In recent years, research has become more sophisticated, making it possible to statistically control and weigh the importance of these factors. Student ability, student interest and family characteristics strongly influence achievement. Where class size is confounded by these other sources of achievement, it is impossible to determine how much class size is contributing to learning outcomes (Mitchell,

1989). Bourke (1986) found several student variables influencing the outcomes of class size research: class ability, family background, level of expected education, and attitudes toward subject area. A review of the literature by the South Carolina State Department of Education (1980) found that class size has been shown to be only one of many variables which influence achievement. Other variables which interacted with class size to influence the learning setting and its outcomes included student characteristics (intelligence; achievement level; health; family stability; occupational, educational, and social background; emotional stability; motivation; self-concept; and over-all attitude); teacher characteristics (such as competency, personality, motivation, inclination to use appropriate and diverse methods of instruction, attitude toward class size, teaching experience); the instructional program, strategies, and purposes; subject being taught and course content; reasons for changing class size; economic factors; and scheduling procedures. As McKenna (1977) stated, student characteristics may be as important as, if not more important than, most criteria in making class size decisions.

In summary, the problem with research that looks at naturally occurring associations between size of class and pupils' performance is that we often do not know whether the results can be explained by other factors (Blatchford & Mortimore, 1994). Research must find some way of getting over the problem that perhaps something about the kinds of pupils or teachers in small or large

classes might explain any differences found. What is needed is experimental research comparing the progress of pupils who have been randomly assigned to classes of different sizes. Teachers would have to be similarly assigned to random classes of different sizes (Blatchford & Mortimore, 1994).

Social Issues

Educators have debated the issue of class size for years. The former norm found in families (two middle-class biological parents in the home with one parent working) is no longer typical. In today's schools, students are increasingly hindered by poverty, parental drug/alcohol use, and by the effects of low birth-weight (Nye, 1992). News media daily report on homelessness and changing family structure--one parent, both parents working, etc. (Nye, 1992). Families can be disrupted in a variety of ways through poverty, social disadvantage, and homelessness. All of this can challenge a child's natural development and his/her ability to learn (Nye, 1992). Consider the challenge that these problems pose for teachers who work with these children in their first years of school. As Nye (1992) makes clear, educators must make adjustments--particularly in the early primary grades--to accommodate changing clients and client needs. Years ago, when fewer school entrants were from impoverished or disrupted families, teachers might have been able to work effectively with 30 or more pupils. The needs of second language

learners and children with disabilities add to the challenges of this already diverse environment.

One approach to meeting the demands of students today is to have fairly small classes for all pupils, especially in early grades--a change from "assembly-line" to "case-load" approaches (Nye, 1992). There are small classes for special students (those who have handicaps or who are gifted). When you think of it, aren't all pupils special? Aren't the new entrants who come from diverse backgrounds special (Nye, 1992)? Given the added needs of children entering schools in the 1990s, the use of small classes may be imperative for later school success for all students.

A recent review of the research indicated that, at least in the primary grades, there is general agreement that smaller classes facilitate learning and have other beneficial effects for the learner, teacher, and classroom atmosphere (Helmich & Wasem, 1985). Research findings and child development theories regarding the physiological, psychological, and sociological characteristics of kindergarten/primary students support the need for individual teacher attention to a greater extent than is required for older children (Helmich & Wasem, 1985). Young children tend to be characterized by emotional dependency, developing cognitive/reasoning ability, shorter attention spans, and rudimentary social skill. Adequate teacher accommodation to these characteristics is directly influenced by the number of

children to whom a teacher must respond, and instructional time is affected by the extent to which a teacher is able to meet these needs (Helmich & Wasem, 1985).

Children in the primary grades benefit from small class sizes because of their need for individualized instruction and teacher attention. This developmental stage is further characterized by the need to learn through activity and experiential learning to a greater extent than for older children (Helmich & Wasem, 1985). Primary teachers often indicate that instruction must be adapted to meet the developmental needs of children at this level, since they generally have short attention spans and are easily distracted. Typically, a primary teacher is required to act as a surrogate mother or counselor in addition to fulfilling the role of teacher (Helmich & Wasem, 1985). These characteristics form the basis for the argument that smaller classes enable teachers to provide the individual attention that young children need for optimum learning to occur. Finally, a child's adjustment and achievement during the early school grades can have implications for the child's long-term educational progress (Gullo & Burton, 1993).

Child development theory and research supports this conventional wisdom (Helmich & Wasem, 1985). The broad variety of cultural, ethnic and socioeconomic factors are still dominant when children enter school. In addition to these differences, the physical, social, psychological and cognitive

characteristics of young children are unique in contrast to older children (Helmich & Wasem, 1985). Cognitively, Piaget emphasized the importance of social interaction with small groups of children in order to correct the egocentric views of the young child. Socially, children need teacher affection and approval. Emotionally, children express feelings openly, need frequent reassurance, and are beginning to accept rules (Helmich & Wasem, 1985). Teachers at this age level must attend to children's emotional needs to a much greater extent than teachers of older children. Meeting student needs becomes a prerequisite to instructional activities. Young children need emotional support, attention, affection, and approval from their teachers to facilitate learning and school adjustment (Helmich & Wasem, 1985). However, due to economic poverty among families, the incidence of inappropriate school curriculum, and other circumstances, increasing numbers of children are not able to adapt successfully to schools as they presently exist (Gullo & Burton, 1993).

Results of Class Size Research

Armed with an understanding of the history of class size and with some knowledge about human development theory and current social issues facing today's schools, I am now ready to look at what current research has to say about the results of reducing class size. Bearing in mind that research has its problems and limitations, we can at least look at some of the most carefully

designed and controlled studies for indications of where to go with policy decisions. By looking at what current research says, we can then look at other issues such as cost, policy implications, and space concerns.

Some issues related to schools would appear to make so much sense that people wonder why researchers study them. Class size--the number of pupils that a teacher works with at a given time--is one such issue (Nye, 1992). It seems intuitively logical that dramatically smaller classes (one teacher to approximately 15 students) should influence the teaching learning process in positive ways (Bain & Achilles, 1986). Some parents elect to send their children to private schools because of the smaller classes that make individual attention more available (Bain & Achilles, 1986). Probably most of us would take the view that--other things being equal--children are more likely to receive a better quality of education in small classes.

Why do small classes matter? The results of twice as many studies favored small classes over large classes. Those studies which revealed class size to have no effect on student achievement were based almost totally on assessments of cognitive learning. Those which found class size to be significant measured other areas of growth as well, including aesthetic, personal, and creative development; problem solving skills; and mental health (South Carolina State Department of Education, 1980). Some of the positive effects of class size reductions that are likely to accrue are the following:

increased opportunities for more individual attention and more individualized teaching; better use of teaching materials, organization, and imagination in activities; better use of quality assessments; progress and needs assessed more accurately; a higher quality of cognitive and task monitoring of activities; more opportunity for in-depth teaching of basic content; and more opportunities for pupils to engage in learning experiences using concrete materials (South Carolina State Department of Education, 1980).

In small classes, curriculum tends to take on more variety, breadth, depth, and richness. Basic instruction is often completed more quickly, providing more time for covering additional material and more use of supplementary texts and enrichment activities (South Carolina State Department of Education, 1980). Blatchford and Mortimore (1994) stated several benefits to reduced class size. They said it is more feasible to know children better, understand their needs, and plan how to meet them with smaller classes. Pupils in smaller classes attend more and spend more time on task. Students tend to participate more and are more absorbed in what they are doing (Blatchford & Mortimore, 1994).

In smaller classes there is apt to be better teacher control and less time spent managing pupils' behavior. Classroom management is often easier. There are fewer student interruptions, and potential discipline problems are identified and solved more quickly. Smaller classes tend to give teachers more

time for instruction and individual attention for students (Blatchford & Mortimore, 1994).

Student attitudes in smaller classes are often improved, especially in grades K-3. Teacher morale is higher, attitudes to students are better, and satisfaction with performance greater in smaller classes. There are also some reports that there are positive effects found on student attitudes to school and teachers, on self concept, and on student motivation. There is support for the view that smaller classes can improve pupils' relationships with each other (Blatchford & Mortimore, 1994). As Nye (1992) said,

> Small classes allow for more developmentally appropriate curriculum, instruction and parent involvement. Small classes are especially important for children through third grade and for teachers who increasingly must deal with greater pupil disadvantagement and diversity in single grades. (p. 3)

The South Carolina State Department of Education (1980) conducted a review of the literature during which it found that in smaller classes, students usually learn basic skills and subject matter better, more easily, and faster; think more creatively and divergently; develop more positive attitudes, perceptions, and better human relations with other students and their teachers; function more effectively as members and leaders of varying size groups; achieve higher attention and lower absence rates; are more fluent, proficient in writing, listening, and speaking skills; demonstrate less fighting, shoving, pushing, crowding, striking, or other aggressive acts; have fewer fears about

not being right or about not being free to say what they mean; have more trust and confidence in their peers and their teachers; and contribute more voluntarily, display more initiative, and participate more promptly, eagerly, and enthusiastically. In smaller classes, teachers have the opportunity to experience greater personal satisfaction, a greater sense of achievement, and more genuine enjoyment in teaching; deal more individually with misbehavior problems and diagnose causes before major problems occur; develop more innovative, diverse, creative teaching practices; take greater initiative to increase student motivation; provide more individualized instruction; effect better classroom management and discipline; experience reduced teacher stress and tension, fewer learning and behavior problems, less paperwork, and a more thorough knowledge of individual children; and experience a greater quantity and quality of interactions with students.

The atmosphere in the smaller class is generally characterized by greater freedom to test ideas with less anxiety and tension; a general emotional tone of greater warmth, courtesy, empathy, kindness, consideration, and respect among students and teachers; more diversified, creative activities; greater freedom for oral expression; and reduced levels of frustration, restlessness, tension, and personal conflicts among students (South Carolina State Department of Education, 1980). The issue of class size may be more an issue of identity. Large classes produce more alienation and stress, while

smaller classes foster personal development, identity, and emotional well-being. While the above claims seem almost remarkable and perhaps too good to be true, other studies seem to indicate similar general conclusions (Gullo & Burton, 1993; Helmich & Wasem, 1985; Johnston, 1990; Klein, 1985; Mitchell, 1989; Ryan & Greenfield, 1975; Smith & Glass, 1980). It certainly seems logical that at least some of these benefits may accrue from smaller class sizes.

Perhaps the biggest problem related to the class size question remains the lack of convincing theory on how reduced student/teacher ratios are actually turned into achievement gains (Bracey, 1990). Bracey examined four possibilities. With increasing class size, it takes longer to conduct the nonacademic routines, and this leads to more academic "down time." In larger class sizes students might interact more and thus it takes longer to reach closure for each activity. It has been hypothesized that teachers focus on the least-able students in class, so if students from a normally distributed achievement curve are assigned randomly, large classes are more likely to get low-ability students. Finally, if we consider the teacher as a "fixed instructional resource," then there is less of that resource to go around as class size grows. There could be interactions among the different hypotheses as well (Bracey, 1990).

With a general understanding of some of the characteristics that set large and small classes apart, it is now imperative to examine more closely some of the large scale research studies conducted recently to examine the effects of reduced class size. Project STAR and Indiana's PRIME TIME were two of the most notable and recent studies done. Both were studies conducted in the primary grades.

Project STAR (Student-Teacher Academic Ratio) came about as the result of a comprehensive education reform called the Better Schools Program conducted by the Tennessee State Legislature in the spring of 1984 (Word, 1990). The Tennessee Legislature funded a major policy study to consider the effects of class size on students in the primary (K-3) grades. A consortium of persons from the Tennessee State Department of Education, STAR staff, four universities, and a representative each from the State Board of Education and the State Superintendents' Association worked together to develop the study design, plan the research, analyze the data, and prepare periodic reports of progress for the State Board of Education and the legislature (Word, 1990). The legislation specified that the project should include "inner city, suburban, urban, and rural schools" to assess the effects of class size in different school locations (Word, 1990). Results were obtained from small classes of between 13 to 17 pupils, regular classes of 22 to 25 pupils, and classes of this size with an aide (Mosteller, 1995). All Tennessee schools were invited to participate.

The project schools did not receive any special considerations other than class size. The project began in kindergarten in 1985-86 and followed students successively through grades one, two, and three. Schools had to agree to the random assignments of teachers and students to the different class conditions. Two key design decisions were to have a within-school design and random assignment of both teachers and students to class types (Word, 1990). A student in a small class in kindergarten remained in the small class for grades one, two, and three to assist the measurement of cumulative effects of the class type (Word, 1990).

The study was a first step in answering the question, "Does class size really make a difference?" (Jacobs, 1987, p. 9). The first purpose of the study was to investigate the effect of class size on reading achievement. The second purpose was to correlate the effect of class size with reading achievement as it related to gender, race, socioeconomic status, geographic localities, and attendance of students (Jacobs, 1987). Three million dollars annually for four years was appropriated for the study. Project STAR was a four-year longitudinal study that followed most of the same children from kindergarten through third grade (Jacobs, 1987).

Project STAR's early kindergarten results showed a definite advantage for small classes in achievement, but no significant advantage for the use of a teacher aide (Word, 1990). At the end of first grade, Project STAR students in

small classes were outperforming students in regular and in regular/aide classes by substantial margins on standardized tests and on the state's Basic Skills First Test of reading and math (Word, 1990). Students in the small classes made higher scores on the Standard Achievement Test and on the Basic Skills First Test in all four years (K-3) and in all locales (rural, suburban, urban, inner city) (Pate-Bain, Achilles, Boyd-Zaharias, & McKenna, 1992). Students in small classes continued to outperform students in regular and regular with a full-time aide classes on all tests in second grade (Word, 1990). By grade three the pattern of results established in kindergarten had become firmly fixed. Students benefited from small classes wherever the small classes were located. Trained and untrained teachers did equally well across all class types (Word, 1990). The greatest gains on the Stanford were made in inner-city small classes. The highest scores on the Stanford and the Basic Skills Test were made in rural small classes (Pate-Bain et al., 1992). Small class size was found to be a statistically significant factor in kindergarten reading readiness achievement (Jacobs, 1987). Students in smaller classes had a greater opportunity for success in school. Essentially, the results indicated that a school system would get a greater return for its investment if it reduced class size as opposed to hiring a full-time aide (Jacobs, 1987). It seems interesting that a mere reduction of eight students (from 23 to 15) made the test scores go up as dramatically as they did. What would happen with even greater

reductions? The study also indicated that a school system would receive greater returns when its free/reduced lunch students were in classes with a 1:15 ratio (Jacobs, 1987). Results showed that the effect of small class size on the achievement of children of color was initially double that observed for white children (Mosteller, 1995). The highest mean score for inner city students was obtained in the small class, indicating that small class size is one of the most essential elements needed by inner city students for mastery of reading readiness objectives (Jacobs, 1987). The highest mean score was recorded for students in the 94% to 97% of days present category in the small class. Very low attendance is so detrimental to student achievement that small class size cannot provide the reinforcement time necessary for mastery of reading readiness skills (Jacobs, 1987).

Word (1990) found that the small-class effect was concentrated in kindergarten and Grade 1. The small class effect did not have a continuing cumulative effect after the large gains in kindergarten and in Grade 1. The large gains favoring the small classes made in the first year were still evident in later years, but there were no significant gains in future years. Thus, class size reduction should be concentrated in kindergarten and Grade 1, where effects are greatest (Word, 1990). Also, small classes were found to reduce grade retention. In terms of affective outcomes, students in the inner city had somewhat higher self-concept scores than students in the other locations.

Students in small classes in kindergarten had significantly higher self-concept scores (Word, 1990).

Teachers reported that they preferred small classes in order to identify student needs, provide more individual attention, and cover more material effectively (Pate-Bain et al., 1992). Their comments revealed a number of ways instruction benefited from small class size: basic instruction was completed more quickly, there was more use of supplemental texts and enrichment activities, there was more in-depth teaching of the basic content, there were more frequent opportunities for children to engage in firsthand learning activities using concrete materials, there was increased use of learning centers, and there was increased use of practices shown to be effective in the primary grades. They also reported increased monitoring of student behavior and learning, greater opportunities for immediate and individualized reteaching, more enrichment, more frequent interactions with each child, a better match between each child's ability and the instructional opportunities provided, a more detailed knowledge of each child's needs as a learner, and more time to meet individual learners' needs using a variety of instructional approaches (Pate-Bain et al.).

Johnston (1990) found that teachers of small classes felt better able to conduct frequent class discussions, involve more children in group discussions, and thus cover content in more depth. Since classroom management became

less of a problem with reduced class size, teachers made greater use of activities that with a regular class would have been viewed as too great a threat to necessary levels of classroom control (Johnston, 1990). The notion of the teacher as a fixed resource may also be helpful in understanding teacher perceptions that they are better able to meet children's nonacademic needs, that they are able to listen and talk with children regarding personal concerns, and that they have better knowledge of children's lives and needs outside of school (Johnston, 1990). "Jeremy Finn and C. M. Achilles noted, 'This research (STAR) leaves no doubt that small classes have an advantage over larger classes in reading and mathematics in the early primary grades'" (Pate-Bain et al., 1992, p. 254).

The STAR researchers put forth several recommendations regarding class size. They stated that it was important to mandate kindergarten attendance for all students, that the pupil/teacher ratio for kindergarten should be lowered to 1:15 to provide all students an appropriate basis for learning, and that there should be in-service and summer training sessions provided for teachers with 1:15 ratio classrooms (Jacobs, 1987). These sessions should include appropriate instructional techniques for small group or individualized instruction, training about more in-depth understanding and knowledge of child development, and early childhood guidance training so that every teacher would become a guidance counselor within the classroom (Jacobs, 1987).

Project STAR was only a first phase of the research conducted in Tennessee to determine the effects of smaller class size in the earliest grades on short-term and long-term pupil performance. A second phase, called the "Lasting Benefits Study" (LBS), was begun in 1989 to determine whether these benefits persisted (Mosteller, 1995). Even though the LBS study lacked the design strengths of Project STAR (LBS was "field research" while STAR was a carefully controlled study), the Lasting Benefit Study yielded clear and consistent results (Nye, 1992). Children who were originally enrolled in smaller classes continued to perform better than their grade-mates from larger classes when they were returned to regular-sized classes in later grades (Mosteller, 1995). The positive effects of involvement in small classes were pervasive two full years after students returned to regular-sized classes (Nye, 1992). LBS showed that early small class involvement has continuing benefits (Nye, 1992). Mosle (1996) reported that some of the latest reports indicate that the class size effects on reading and math scores held well into junior high, despite the fact that students had long since been returned to regular-size classes. A small class size in the earliest grades speeds learning in these years and confers lasting benefits for students in later grades (Mosle, 1996). In the third phase, Project Challenge, the 17 economically poorest school districts in Tennessee were given small classes in kindergarten through third grades. As a consequence of the Project STAR and Lasting Benefit findings, in 1989

Tennessee provided funding and incentives for local district leaders to reduce class size in grades K-3 to approximately 1:15. The districts improved their end-of-year standing in rank from well below average to above average in reading and mathematics (5.3 ranks in reading and 6.6 ranks in math) (Nye, 1992). Based on STAR's results, policy leaders in at least a dozen states have enacted or are discussing class-size initiatives (Achilles, Finn, & Bain, 1997).

In addition to Project STAR, there have been other significant recent studies on class size. Indiana conducted a study called PRIME TIME. The Indiana General Assembly appropriated $300,000 for the 1981-1982 and 1982-1983 school years to reduce the student/teacher ratio to 18:1 in 24 kindergarten, first, and second grade classrooms (Bain & Achilles, 1986). The schools chosen were located in cities, small towns, and rural areas. Larger comparison classes contained approximately 22 students (Gilman, 1988). This study sought to determine whether students who participated in the PRIME TIME program had higher achievement scores, mastered more skills, had a higher self concept, had a better attitude toward school, and had higher total affective scores than those students taught in larger classes (Gilman, 1988).

The findings provided overwhelming evidence of the gains in scores for students in the 1984-85 small-size classes as compared to the larger classes of the 1983-84 school year (Bain & Achilles, 1986). When the means of PRIME TIME group achievement and attitudes were compared to the means of

larger class group (non-PRIME TIME), the results showed that there were significant differences in all areas compared (reading, math, self concept, attitude toward school, and total affective) favoring PRIME TIME classes (Gilman, 1988). The means of PRIME TIME classes of recent years were generally significantly higher than the means of PRIME TIME classes of earlier years (Gilman, 1988). Somewhat unexpected were the achievement gains experienced by students in the last year of the study (Gilman, 1988). Less dramatic gains were experienced by these students on some of the affective measures (Gilman, 1988).

This two-year program yielded three outcomes. First, students in the small classrooms scored higher on standardized tests than students in larger classes. Second, students in smaller classes had fewer behavioral problems than their counterparts in larger classes. Finally, the teachers of smaller classes reported that they were more productive and efficient than when they had taught in larger classes (Bain & Achilles, 1986). In 1989, the Indiana General Assembly appropriated $19 million for the reduction of class size in first-grade classrooms across the state to fund ratios of 18:1 (Bain & Achilles, 1986).

Data indicated that teachers, parents, and principals were enthusiastic about PRIME TIME, believing above all else that smaller class size increases the amount of individual attention teachers give to students (McGiverin,

Gilman, & Tillitski, 1989). There was also strong consensus that smaller class size increases teacher morale and student achievement (McGiverin et al.).

There have been other less extensive studies that have indicated similar outcomes as those mentioned in Project STAR and PRIME TIME, particularly in the primary grades. Researchers in Chicago studied government funded kindergarten classes in more than 100 schools, most of which serve low-income families (Bain & Achilles, 1986). The classes varied in size and in duration (full day or half day). The researchers found that the strongest influence in kindergarten achievement appeared to be the pupil/teacher ratio (Bain & Achilles, 1986). They noted that youngsters in classrooms with pupil/teacher ratios of about 16:1 achieved at or above national norms on a standardized achievement test, even when those classrooms provided only half-day instruction (Bain & Achilles, 1986).

In another study, the effects of children's socioeconomic status (SES), class size in kindergarten, and prior prekindergarten experience on early school adjustments were examined (Gullo & Burton, 1993). Kindergarten achievement and attendance were used as measures of early school adjustment. A significant finding was that a number of potentially negative effects associated with SES were ameliorated if the children had a prekindergarten experience and/or were in smaller class sizes (below 20) in kindergarten (Gullo & Burton, 1993). For children in the low-SES group, those

in class sizes below 20 scored significantly higher than children in class sizes above 25 (Gullo & Burton, 1993).

In Louisiana, a study was conducted to investigate the impact of small class size on first grade students in schools whose students demonstrated a high need for additional academic assistance (Sabrio, Pechman, & Rubin, 1982). High need was determined through reading and math test scores, pupil/teacher ratio, free lunch participation, and percent of AFDC recipients. Students in ten elementary schools were studied, and no additional instructional services were provided. Class size was reduced to a maximum of 22 students per teacher. The lower pupil/teacher ratio was associated with significantly higher achievement gains in both math and reading skills (Sabrio et al.). Teachers with lower pupil/teacher ratios had positive attitudes and felt their students performed better in school on a day-to-day basis. Parents and principals made overwhelmingly favorable comments regarding the concept of reduced class size in its effect on student achievement and self-concept. Other benefits included improved teacher-parent contact, expansion of skills development, and fewer discipline problems (Sabrio et al.).

In yet another study, class size in four second grade classes was reduced midway through the year by removing one-third of the children in each class to a newly created class (Filby, Cahen, McCutcheon, & Kyle, 1980). The four classes were studied throughout the year, in both the "large" class and

"small" class phase. In one school, class size was reduced from 20 to 13. In the other, class size was reduced from 35 to 22. Information was collected through observation, quantitative recording of behavior in some predetermined categories, teacher journals, and teacher/principal interviews. Classroom management seemed easier and was more effective with smaller classes (Filby et al.). Smaller classes functioned more smoothly. Student attention rates were higher, accompanied by a decrease in time spent waiting for help. Students tended to become more actively involved during lessons. Students had more chances to participate during lessons. In the small classes, teachers were able to relax more and felt more positive about the class. Lessons proceeded more smoothly so teachers could cover the material more quickly. Teachers were able to spend more time personally on specific parts of the program. They could go into greater depth, they could sometimes cover material more quickly, and they could provide more enrichment activities. Teachers could spend more time with each individual student (Filby et al.). One caution was that these teachers felt the relief of a sudden reduction in class size, which increased their enthusiasm. As teachers became acclimated to a new class size, they might make fewer changes (Filby et al.).

As Glass and Smith (1979) found in their meta-analysis of research and the previous studies (STAR, PRIME TIME, etc.) indicated, a clear and strong relationship between class size and achievement has emerged. While there

may appear to be little correlation between class size and achievement in studies carried out before 1940, there seems to be a rather strong relationship favoring smaller classes in post-1960 studies (Glass & Smith, 1979). The sophistication of experimental design and measurement differ between the two eras. The relationship is seen most clearly in well-controlled studies in which pupils were randomly assigned to classes of different sizes. There is little doubt that, other things being equal, more is learned in smaller classes (Glass & Smith, 1979).

A new review of research by Mitchell, Carson, and Badarak has concluded that--even taking into account the flaws in the best studies--the finding that achievement rises as class size falls is irrefutable (cited in Bracey, 1990). They write that, "While no reputable scholars continue to challenge the basic finding that achievement increases as class size goes down, there are important disagreements over how large the gains may be and how they are produced" (cited in Bracey, 1990, p. 732).

Early studies of class size defined student learning entirely in terms of cognitive achievement. Over time, increased attention was given to a variety of non-achievement outcome variables (Mitchell, 1989). Glass (1980) stated that, "our study of class size and affective outcomes shows that increasing class size from 20 to 40 will take its toll on pupil attitude and interest, teaching practices, and teaching morale" (p. 242). The analysis by Smith and Glass

(1980) revealed a substantial relationship between class size and teacher and pupil attitude, as well as instruction. Favorable teacher effects (workload, morale, attitudes toward students) are associated with smaller classes, as are favorable effects on students (self-concept, interest in school, participation) (Smith & Glass, 1980). Smaller classes are associated with greater attempts to individualize instruction and better classroom climate. Student attitude, individualization, student participation, quality of instruction, and teacher attitude all benefited positively from a reduction in class size (Smith & Glass, 1980). The effect was greatest for pupils 12 years and under, somewhat less for pupils 13 to 17, and least for pupils 18 and over.

Improved academic achievement is not the only justification for decreasing class size. Pupils' self-esteem and satisfaction with school and a favorable affective and social climate in the classroom are desirable outcomes in themselves (Smith & Glass, 1980). Reduction in class size is associated with higher quality schooling and more positive attitudes. Class size affects the quality of the classroom environment (Smith & Glass, 1980). Chances are good that the climate is friendlier and more conducive to learning. Students are more directly and personally involved in learning. There seems to be less student apathy, friction, and frustration. Class size affects teachers. Their morale is better, they like their pupils better, and they have more time to plan and diversify in smaller classes (Smith & Glass, 1980). In sum, reducing class

size has beneficial effects both on cognitive and affective outcomes, and on the teaching process itself.

Several studies indicated that the time in a student's school career when he/she is exposed to small classes is an important factor (Ryan & Greenfield, 1975). Lower class size is most effective in producing positive outcomes at the lowest grade levels. This effect diminishes by third grade (Ryan & Greenfield, 1975). Smaller classes in the early years of schooling, because such classes enhance learning through individualization, have a "carry-over" effect in later grade levels. If pupils have obtained adequate reading skills in earlier years they tend to do fairly well later on on almost any kind of test (Ryan & Greenfield, 1975). Project STAR found that the maximum effect of reducing class size is in kindergarten and first grade (Folger, 1990). As said earlier, one possible cause of the greater effect in kindergarten and first grade is that young children, five and six years old, require more individual attention and are not as well socialized to classroom routines as seven and eight year olds might be (Folger, 1990). The need for extra attention during the early socialization of the child to school is one possible explanation of the greater effect of small classes in kindergarten and first grade (Folger, 1990). Folger (1990) stated, "If class size is to be reduced, put first priority on kindergarten and first grade" (p. 124).

As Mosteller (1995) said, when children first come to school, they need training in paying attention, carrying out tasks, and interacting with others in a working situation. They need to learn to cooperate with others, to learn to learn, and generally to get oriented to being students (Mosteller, 1995). The small class sizes help teachers achieve this process more effectively with students. Also, when you consider second language learners' needs, the effects of this are more important and the needs are even greater (Mosteller, 1995).

Helmich and Wasem (1985) found many important conclusions related to the optimum age for reduced class size. Small classes in the primary grades are important for reading and mathematics achievement. Primary students taught for two or more years in small classes are more likely to show increased achievement (Helmich & Wasem, 1985). Particularly in the earlier grades, children need the extra attention available in smaller classes because they are emotionally and intellectually dependent on the teacher and on concrete stimuli (South Carolina State Department of Education, 1980). As children mature and become more independent, a small class is no longer as critical for the emotional and developmental needs as during the younger grades. According to Gullo and Burton (1993), for the early childhood levels (prekindergarten-grade 3), the results of class size research are relatively consistent in documenting a link between smaller classes and children's successful

academic and social adaptation to school. This is particularly true for children with economic and other educational disadvantages (Gullo & Burton, 1993).

Blatchford and Mortimore (1994) found that children in the early years of school are most likely to benefit from smaller classes, at least in the basics of mathematics and reading. This applies especially to low achievers, and economically and socially disadvantaged pupils. The STAR results found that in small classes, children of color had attainment scores similar to white pupils, whereas in regular classes they were far behind. It seems that the effect of being in small classes is marked for children of color from K to grade 3 (Blatchford & Mortimore, 1994). Project STAR suggests that all students benefit from small class size and that children of color benefit more than white students (Achilles, Finn, & Bain, 1997). This is one reason why STAR researchers believe that reduced class sizes in the first years of schooling can prevent problems developing in pupils, but they are <u>not sufficient</u> to "remediate" problems. For benefits to result, pupils have to start school in small classes; entering small classes later has less benefit for pupils, and cannot be expected on its own to affect difficulties that may have developed (Blatchford & Mortimore, 1994). Mosle (1996) stated that, "The place to start is in the earliest grades, kindergarten through third, in order to give all children the solid educational foundation they need to succeed later" (p. 38).

Optimum Class Size

At what point are the effects of class size noticeable? What is the magic number or optimum class size? When do the many advantages of reduced class size first start to appear? From the Glass meta-analysis, effects increased for class sizes below 20 and especially below 15 (Blatchford & Mortimore, 1994). The greatest gains in achievement were among students who were taught in classes of 15 pupils or fewer. However, teachers appreciated a reduction in class size of even a couple of students (Klein, 1985). The STAR research shows that classes around 15 pupils in the early grades do much better than classes around 25. The STAR researchers sought to reduce class sizes to 15 students, the point at which Glass and Smith found that reduced class size began to produce large effects on achievement (Bracey, 1995).

The consensus from research seems to be that reducing class sizes by a few pupils across the board is unlikely to be effective and that effects are unlikely to be marked until classes are reduced to below 20 (Blatchford & Mortimore, 1994). Bain and Jacobs (1990) stated that there is no clear answer to the issue of maximum effective class size. They stated that the maximum must be set in relationship to the grades included and the dollars spent. While research clearly shows that significant achievement is obtained with a cap of 15 students per teacher, no state has established a maximum that low. Studies

by the Educational Research Service and others found a "break point" on the high end at 22 students per classroom (Bain & Jacobs, 1990). Gullo and Burton (1993) discovered in their research that many current policy guidelines recommend a class size of no greater than twenty students for the prekindergarten and kindergarten levels. Actual public school kindergartens often reach class sizes of 25 students and higher (Gullo & Burton, 1993).

Helmich and Wasem (1985) stated that the optimum class size cannot be identified on the basis of available research and that it is unlikely, given the differences in children's needs, teacher characteristics and environmental conditions, that an appropriate class size can be determined at a distance from the specific classroom. The issue, however, is more than one of class size per se or class size as it relates to budget. It is a more specific issue of class size for what and for whom. No single optimum class size applies to all situations, and a flexible approach is usually more suitable than a rigid class size policy--a flexible approach to allow varying class size for varying instructional purposes and student needs. Students needing more special and individual attention--slow learners, bilingual children, children with handicaps--should be in smaller classes (South Carolina State Department of Education, 1980). McKenna (1977) said that class size for whom becomes a matter of deciding what individuals, based on needs and interests, shall be placed in what size groups, how often, and for how long.

There is often a resistance to the specification of maximum class sizes because it might make it easier to justify sizes up to that limit (Blatchford & Mortimore, 1994). It must be remembered that classes at the primary level are slowly getting larger. Without a deliberate shift of policy or funding, it is quite likely that this process will continue. There could be much more public discussion about optimal, maximum and even minimum class sizes (Blatchford & Mortimore, 1994).

Chapter III

CONSIDERATIONS FOR THE APPLICATION OF THE RESEARCH

Recommendations to Capitalize on Smaller Class Size

Although it is an established fact that smaller classes offer increased opportunity for improving instructional practices, it is also an established fact that teachers do not automatically take advantage of these opportunities, often sticking to the same teaching methods they have used for years (South Carolina State Department of Education, 1980). Blatchford and Mortimore (1994) found that teachers do not change their methods of teaching when faced with smaller classes. If they continue to engage in the same amount of whole class teaching, then there will be little effect of having fewer children in the class. This has led some to argue that class size reductions are unimportant and that the issue is more to do with changing teaching approaches (Blatchford & Mortimore, 1994).

Mitchell and Beach (1990) said that although the link between class size and student achievement is substantial and convincing, this does not mean that every small class produces greater learning. Simply changing the number of

students in a classroom cannot, by itself, be expected to change learning outcomes. Evidence indicates that other changes in classroom operations are necessary to produce the achievement gains that accompany class size reductions (Mitchell & Beach, 1990). Research on this issue is particularly confusing, however, because researchers have presented no theory of how altering class size produces these changes in classroom operations (Mitchell & Beach, 1990).

A review of literature by the Educational Research Service concluded that existing research findings did not support the contention that smaller classes will of themselves result in greater academic gains for pupils (Gilman, 1988). They also found that children in lower grades, disadvantaged youngsters, and those with lower academic ability do achieve more when in smaller classes, provided that the teachers adjust methodology to reduced class size (Gilman, 1988). Folger (1990) stated that what is needed are comprehensive approaches to change class size, teaching strategies, and curriculum at the same time to achieve a clearly identified goal. Class size reduction will need to be targeted to specific outcomes, and connected with an overall strategy for change (Folger, 1990).

Bain and Jacobs (1990) made it clear that the lowering of class size must be matched with a change in teacher behavior. Teachers must receive extensive and continuous training to alter their teaching strategies. It makes

sense to provide teachers with smaller classes and then train them to teach effectively in those classes (Bain & Jacobs, 1990). Smaller class size has little benefit unless teachers use appropriate instructional methods and procedures, such as small-group and individualized instruction (Helmich & Wasem, 1985). Cahen and Filby felt that reduction in class size must be accompanied by the support and education of teachers to enable them to realize the potential of a smaller class (Helmich & Wasem, 1985).

Even in studies that favored small classes there was evidence that many opportunities were being missed (Ryan & Greenfield, 1975). At times small classes continue to be mass oriented. The quality of teachers is equally important. Ryan and Greenfield (1975) found in their review of the research that teachers have often developed skills and techniques applicable only to classes of more than 20 pupils, and they are not equipped to capitalize on opportunities that small classes provide. This has led some people to suggest that special help must be provided teachers. Teachers need to be taught how to effectively teach small classes (Ryan & Greenfield, 1975). Bourke (1986) found that the implementation of different teaching practices in classes of different size caused variations in achievement. It is these teaching practice variables that may provide some understanding of why smaller classes produce higher achievement, given students of equal ability and schools with similar characteristics (Bourke, 1986).

We have to take deliberate advantage of the opportunities created from reducing the class size or introducing more favorable pupil to teacher ratios (Blatchford & Mortimore, 1994). Any planned reductions in class sizes would need to be accompanied by careful planning, inservice work, support, and review. A review of teaching methods, classroom management, and inservice training is needed in order to maximize potential benefits (Blatchford & Mortimore, 1994). The teacher who has had special inservice training to maximize instructional possibilities in large or small classes will be more apt to achieve optimal results whatever the class size. A plan is needed to support and educate personnel to realize the potential which exists in instructional techniques for various class sizes (South Carolina State Department of Education, 1980).

Little descriptive information exists, however, about how teachers may adapt teaching practices to take advantage of possible benefits of reduced numbers. Evertson and Randolph (1990) said that with few exceptions, studies of class size have examined achievement effects, but have not documented how class size affects teaching practices. Teaching practices affected student achievement, but class size did not affect student achievement directly. The effect of class size on student achievement occurred through changed teaching practices (Evertson & Randolph, 1990).

There is some disagreement about the impact of providing training to teachers. Achilles, Finn, and Bain (1997) said that while staff development probably would help, the STAR results were achieved with no staff development in kindergarten and first grade, and the staff development in grade 2 provided no apparent advantages. In another article reviewing the results of STAR, Evertson and Randolph (1990) concluded that an important added feature of Project STAR was the inclusion of summer inservice training for a randomly selected subsample of 3rd grade teachers. The content of the training was derived from research on effective teaching practices and focused on topics teachers identified as important to them. Observations were made in trained teachers' classrooms and in the classrooms of a comparison group. The results indicated that teaching practices did not change substantially regardless of training. A factor that emerged in analyses was the pervasive effect of the mandated curriculum on how the teachers taught, on what was taught, and for what students were held accountable. The inservice training was not strong enough to alter deeply held beliefs about teaching practices (Evertson & Randolph, 1990).

While training for teachers on effective practices appears to hold much promise for capitalizing on small classes, it has been stated that the most important variable in the classroom situation is the teacher (Ryan & Greenfield, 1975). Class size research has failed to adequately control or manipulate the

teacher variable. Until this is done we will not have a complete picture of the effects of class size (Ryan & Greenfield, 1975). Bain and Jacobs (1990) stated, "It is clear from the data (STAR) that the key to a more successful learning experience for children in a smaller class is--as might be expected--the caliber of the teacher at the front of the room" p. 4). When asked, effective teachers answered that they try to prevent failure by involving the families of their students in the learning process. They were also asked to name factors that they believed accounted for their success. These teachers said love for children and teaching, high expectations for their students, patience, and understanding (Bain & Jacobs, 1990).

One of the biggest questions that remains is how best to share the expertise of those teachers who are recognized as being effective (Pate-Bain, Achilles, Boyd-Zaharias, & McKenna, 1992). Communication among teachers is one of the weakest links in our education system. How can we provide more inservice programs that will allow teachers who have never experienced small classes to spend time observing and consulting with effective teachers of small classes (Pate-Bain et al.)?

Complexity of Issues Surrounding Research

Despite the overwhelming positive evidence in recent studies supporting reduced class sizes, the research results remain largely ignored. It seems difficult to comprehend why this would be so, until one stops to consider the

complexity of issues and the nature of policy making surrounding the research. Critics have found a variety of reasons why widespread class size reductions are not feasible. Cost, space issues, insufficient results, and more pressing concerns are often cited as barriers to implementation of reduced class size.

Bracey (1995) said that despite being longitudinal and having been reported in professional journals, Project STAR remains largely ignored by policy makers and reformers (at least at the national level). He speculated as to why this was the case. He said: Could it be because class size requires no fancy new equipment or teacher retraining? Could it be because it lacks the panache of "new standards?" Could it be because it costs money? Could it be because certain individuals cannot assimilate the data? Eleven states have passed legislation either to reduce or cap class size in the early grades since STAR results came out. However, media coverage has been limited. Perhaps the fact that the study was conducted and reported by a regional school (Tennessee State University), means that it lacks the influence of a study from Harvard, for instance (Bracey, 1995). As Nye (1992) said.

> The area of small class benefits to pupils has been quite thoroughly researched. Yet, policy makers hesitate to use the evident solution. While they dally trying to find better (and cheaper) alternatives, the conditions worsen for today's children. (p. 2)

There are differences of opinion over the effectiveness of recent large-scale and very costly initiatives involving class size reductions. There are enormous resource implications. Decisions about class size directly influence

numbers of teachers employed and this is a major part of spending on education (Blatchford & Mortimore, 1994). There is small wonder then that policy makers at the local level, government, and school level are very cautious, fearing the immense costs that would be involved in a substantial reduction in class sizes. Critics have argued that although substantial reductions in class size do have positive effects, the size of the difference reported in even good quality studies is moderate. Reducing class sizes is too expensive to many. However, it would be more in keeping with the research evidence to allocate the funding involved in reducing just first year classes in a substantial way (Blatchford & Mortimore, 1994).

Bain and Achilles (1986) claimed that there are two stumbling blocks that keep reformers from seriously considering a substantial reduction of teacher/pupil ratios in the early grades. First, the evidence still fails to convince funding agencies that smaller classes would be a highly productive use of their funds. Second, the public schools lack the money to pay for the additional teachers, space, materials, and other expenses that smaller classes would necessitate. In the competition for limited school resources, smaller classes in the primary grades are not a high priority (Bain & Achilles, 1986). Mitchell (1989) said that it is important to view the issue from a policy perspective. Adjusting class size is enormously expensive. Class size is the single most important ingredient in determining the overall cost of public

education. Without major organizational changes, substantial reductions in class size would require unprecedented increases in school funding (Mitchell, 1989). Mitchell (1989) claimed that,

> While the benefits of class size reduction are substantial, the cost of securing them may be totally prohibitive. The U.S. Department of Education estimates that it would take five billion to reduce class size in the nation's schools by a single student. (p. 52)

An analysis of alternative approaches to gaining some, if not all, of the benefits of class size reduction should be undertaken (Mitchell, 1989).

Folger (1990) claimed that a one-third reduction in class size would increase per pupil costs about one-third. He said that due to the high cost of substantial reduction in class size, less expensive targeted reductions should be tried. A targeted reduction could reduce class size just for reading or math lessons, or just for classes of low achievers who need special help, for example (Folger, 1990). A research report by the National Education Association concluded that class size policy seems to be determined by more than just cost issues. The determining factors in class size policy appear to be enrollment, finances, space availability and subjective opinions of educators, with research evidence having little effect (Ryan & Greenfield, 1975).

Although some critics say you could spend your money in more effective ways than merely lowering class size, this is simply not true when you consider the early grades (Bain & Jacobs, 1990). The best way to improve student learning in the crucial early grades is to lower class size. Lowering class size

at the elementary grades will require a major re-channeling of new dollars and a shift in school priorities (Bain & Jacobs, 1990). Mosle (1996) pointed out that many education experts have consistently dismissed class size as irrelevant to student performance. She suspects that this position is simply a justification for not spending more on overcrowded urban schools, rather than a fair analysis of the evidence (Mosle, 1996).

Studies such as STAR continue to point to the fact that additional funds are needed to attain high-quality education in this country. It takes money to cut down on the number of students per teacher and to enable teachers to develop particular characteristics and learn to use effective instructional strategies (Pate-Bain, Achilles, Boyd-Zaharias, & McKenna, 1992). Pate-Bain et al. stated, "It is short-sighted to attack class size research mainly on the ground that classes smaller than the norm will be costlier than larger classes" (p. 256). Critics who contend that class size reduction is too expensive for the results achieved and that other procedures are more "cost effective" appear to view education as a mass-production, industrial-age enterprise, best conducted in assembly-line fashion with large numbers of relatively passive children. Pate-Bain et al. instead say that we must view education not as a mass-production effort, but as a personal and individual experience. Class size research is rather an effort to find appropriate casework loads because much of

sound education practice consists of individual instruction, coaching, mentoring, and tutoring (Pate-Bain et al.).

Mosle (1996) offered an interesting perspective on the issue of cost when considering class size reductions. She proposed that instead of giving money to states for special education or other "pull-out" programs, the federal government should give funds to schools exclusively to reduce class size (Mosle, 1996). If every class had 20 students or fewer, then every child would receive a "special" education. Not only should there be small classes, but there should be small schools as well (no more than 20 teachers). Smaller schools and classes would create the kind of communities where teachers, parents and students could work together and know each other as individuals (Mosle, 1996).

Reducing class size to the levels of Project STAR is not cheap However, few well-defined interventions have been shown to have as consistent an impact as this one on the performance of children of color in inner-city settings (Bracey, 1995). The school with small classes would require about $1,000 more per pupil per year. However, scores would go up, and retention rates would go down. Since these are related to dropout rates, society would realize savings in later years. Smaller classes also helped reduce the number of special education referrals in the STAR study--further savings (Bracey, 1995). Achilles, Finn, and Bain (1997) found that teachers in

small classes quickly identify learning problems that go undiagnosed in regular classes. Lack of identification leads to costly special projects later on.

There are several questions regarding class size that are commonly asked, whether by critics or proponents. While the questions do not always have accompanying straightforward answers, they serve to frame the issue of class size. According to Mitchell (1989) there are four key questions that need to be answered or at least looked at when attempting to formulate policy regarding class size reduction. Policy question number one is How much, and how reliably, does a reduction in class size lead to improvement in student achievement? The answer, statistically speaking, is that the evidence is substantial and convincing, but that does not mean that every small class produces greater learning. Policy makers ignore the class size issue at great risk (Mitchell, 1989). Policy question number two is Exactly how do changes in the student/teacher ratio control learning outcomes? Achievement gains produced in smaller classes are produced through identifiable changes in the behavior of both teachers and students. Where changed teaching and learning behaviors do not accompany reduced class size, achievement gains cannot be expected (Mitchell, 1989). Policy question number three is What are the organizational and fiscal implications of the documented link between class size and student achievement? Due to the expense of any class size approach, we need to look carefully at optional ways of handling the

multi-faceted organizational and fiscal aspects of the problem (Mitchell, 1989). Finally, policy question number four is What alternatives to direct increases in the number of teachers and classrooms in today's schools might produce the desired learning achievement outcomes? The traditional assumption of schools with uniform sized, self-contained classrooms may need to be substantially altered in order to incorporate the best findings from class size research into day-to-day school operations. Re-deploying existing teaching and support staff to provide the class size reductions and instructional practices most likely to enhance student achievement will be necessary (Mitchell, 1989).

Other researchers have spoken about key questions related to the class size issue. McKenna (1977) said that a key question becomes "What are the numbers of students in relation to numbers of staff that will provide optimum conditions for instructional purposes?" (p. 8). Obviously at some point too many students make instruction impossible. Common sense alone will tell people that there are points above which instruction is impossible (McKenna, 1977).

Perhaps one of the most important issues regarding class size research and the class size issue today is the very definition of class size itself. What is meant by class size? Most national statistics include nearly everyone in the definition of "teacher" (Bain & Jacobs, 1990). Do you count administrators,

counselors, librarians or aides? Many people do. Class size ratio should be defined in the narrowest terms--the number of students assigned to each teacher, excluding all special area teachers and other support personnel (Bain & Jacobs, 1990). As Achilles, Finn, and Bain (1997) pointed out, some critics of reducing class size base their objections on misinformation or misuse of terms. Confusion over two terms--"class size" and "pupil-teacher ratio" causes problems and misunderstandings in the debate over increasing student achievement through focusing on class size. Class size and pupil-teacher ratio are not the same. Critics of public education often claim that added funds will not improve education quality. They point out that over the years the pupil-teacher ratio has declined, but test scores have not risen proportionately (Achilles et al.). The reason the pupil-teacher ratio has gone down is due to the plethora of special projects or pull-outs (Reading Recovery, Chapter 1, Success for All) that has driven down the pupil-teacher ratio. These special projects are pull-outs for small numbers of students with one teacher (Achilles et al.). Achilles et al. found that with few exceptions this approach has limited success. While these projects do change a school's pupil-teacher ratio, they do not reduce class size. In fact, average class size has increased. Many primary teachers attest that class size creeps upward (Achilles et al.).

In addition to these policy questions, there are a great many false assumptions that those with the power to make policy decisions currently hold

about class size. One favorite assumption of critics is that lower class size only provides better working conditions for teachers (Bain & Jacobs, 1990). Class size needs to be reduced because it increases student learning--whether or not it also improves working conditions is irrelevant (Bain & Jacobs, 1990). Some people like to rely on their personal experience, rather than on research. More children are entering our schools today with more problems, and we also know that the best way to deal with this phenomenon in the early grades is to lower class size (Bain & Jacobs, 1990). Another false assumption is that if we attempted massive class size reductions we would not have enough competent teachers to teach them. If this argument is carried to the extreme, we might have to pack classrooms with 50 or more students, using only the most competent teachers (Bain & Jacobs, 1990). Finally, to those critics who wrongly argue that over the last ten years the pupil-teacher ratio nationwide has been lowered to 17:1, and achievement scores have gone down, it can be argued that this is again a misuse of terms (pupil-teacher ratio). Most of the class size reductions over the past decade have occurred because we have averaged in many new special education programs, English as a second language programs, and other programs for special needs. The 17:1 ratio does not represent merely classrooms of average students in the early grades (Bain & Jacobs, 1990).

Perhaps the greatest support for reduced class size comes from the very public itself. The most recent Gallup Poll of public attitudes toward education once again showed that citizens think small classes are important (Bain & Jacobs, 1990). Eighty-eight percent of nonpublic school parents, 82% of public school parents, and 77% of those with no children in school said that they believed small classes made a great deal of difference. A second question asked if parents would favor a program to reduce classes in the early grades to a ratio of 1:15. Eighty-two percent of nonpublic school parents, 81% of public school parents, and 73% of those with no children in school responded "yes." From among this group of people who answered "yes," 71% of the nonpublic school parents, 72% of the public school parents, and 66% of those with no children in school said they would be willing to pay higher taxes to fund such a program (Bain & Jacobs, 1990). The public perceives small classes as being of major importance to student achievement and progress (Helmich & Wasem, 1985).

Blatchford and Mortimore (1994) said that there has for many years been a good deal of public debate and disagreement about class sizes in schools. The debate has recently become more vocal, with more claims being made in favor of class size reductions (Blatchford & Mortimore, 1994). The size of a class in school is one of the most important and basic ways that the school environment affects children's learning and behavior. It is also one of

the main considerations for why parents choose private education for their children (Blatchford & Mortimore, 1994). Mosle (1996) noted that smaller classes have long been the chief pedagogical tool of private schools and are increasingly becoming the concern of suburban public school parents. It is the feature of private schools that affluent parents are in large part paying for when they send their children to private schools.

In the research conducted with STAR, parents were interviewed. Parents of children in small classes were significantly more likely to report that their child's school progress was above their expectations than were parents of children in larger classes (McGiverin, Gilman, & Tillitski, 1989). Small-class parents were more likely to report that their child's teacher was available for consultation, that their child's reading level was above expectations, that their child received "adequate" or "more than adequate" individual attention, and that class size was "an important factor" in their child's learning (McGiverin et al.).

In Louisiana, both parents and principals remarked favorably about the effects of reduced class size in that study. Parents believed that their child's progress in school was positively affected by reduced class size. Principals expressed support for the project and were interested in possible expansion of the lower class size to other grade levels (Sabrio, Pechman, & Rubin, 1982).

Data indicated that teachers, parents, and principals were enthusiastic about PRIME TIME, believing above all else that smaller class size increases the amount of individual attention teachers give to students (McGiverin, Gilman, & Tillitski, 1989). There was also strong consensus that smaller class size increases teacher morale and student achievement. Some 90% of all teachers said that because of PRIME TIME each pupil received more individual attention and that students received more feedback. In addition, teachers were happier and more enthusiastic about their teaching (McGiverin et al.). Ryan and Greenfield (1975) found that teachers feel more professionally competent in classes they consider to be small or reasonable in size. Filby, Cahen, McCutcheon, and Kyle (1980) stated that teachers and parents believe that smaller classes are better, that they provide a higher quality educational environment and that they promote greater student learning. Teachers have always been frustrated by the failure of research to confirm what, from their personal experience and tacit knowledge, seems so obvious (Smith & Glass, 1980). With greater numbers it is harder to be effective and hence in the teacher's view, the pupils learn less. In the present political environment, one must demonstrate "scientifically" that decreasing class size has social utility--that it produces higher achievement test scores at a reasonable cost (Smith & Glass, 1980).

Alternatives for Achieving Reduced Pupil/Teacher Ratio

Since reducing class size in the traditional sense has often appeared to be an elusive goal, educators have instead searched for alternative means to achieving the benefits of a reduced pupil/teacher ratio. Flexible scheduling, the use of aides, and the flexible use of staff have all been used with varying degrees of success. As Mitchell (1989) remarked, class size in today's schools could be substantially reduced using existing resources if educators at all levels were committed to doing so. This would require a willingness to reconsider long established patterns of organization and administration. Aggressive scheduling changes could do much to lower instructional sizes for various groups of students for at least part of each school day.

According to Mitchell (1989), three distinct strategies could be used for reducing class size: redeploying critical staff members; redistributing the students; and incorporating small class instructional strategies into existing classrooms. Chandler (1989) said, "The challenge for local school boards and administrators is to devise ways to make instruction more individualized and personalized even if class size cannot be reduced" (p. 44). He referenced a 1982 National Institute of Education report that suggested four strategies for achieving this: modifying the distribution of teachers, modifying instructional methods, modifying the distribution of students, and modifying exacerbating factors, such as interruptions. Modifying the distribution of teachers can best

be done at the building level (Chandler, 1989). Even more cost effective is modifying instructional methods to free teachers to work with small groups (using volunteers, for example). Distribution of students can be modified by the teacher through peer tutoring, flexible grouping, parent and community volunteers, team teaching, cooperative learning, and using computers and other individualized aids (Chandler, 1989). Finally, teachers and administrators can deal with exacerbating factors by taking a close look at how instructional groups work and what makes them effective.

The South Carolina State Department of Education (1980) suggested the following alternatives to decreasing class size: team teaching, use of paraprofessionals, nongrading, multi-age grouping, and differential staffing. Schools may also choose to reduce class size throughout a school only for certain classes, possibly for only part of the day. Alternative grouping arrangements may include cross-age and peer tutoring, use of learning centers (that allow teachers to work with smaller groups in separate areas of the classroom); pull-out programs (where individuals or small groups receive more concentrated attention), staggered or split scheduling (with some students arriving at school later in the day and staying later), subject matter grouping (students are placed in small groups according to the subject being taught), and team teaching (Bossert & Barnett, 1981).

Mueller (1985) and Hawkinson (1984) each discussed The Oak Park Plan of rescheduling implemented at the William Hatch School in Oak Park, Illinois. Rescheduling there involved use of a three hour block of uninterrupted time each morning, during which core academic subjects--language arts, reading, mathematics, and social studies--were taught. Teachers were used differently. Specialists took a class for this block of the morning, and then performed their specialty in the afternoon. Instruction in the morning was not interrupted in any way. The enthusiasm of teachers for the new program was apparent to parents, central administration and other teachers in the district (Hawkinson, 1984). Discipline problems were fewer and teachers could give more attention to students with greater needs. Teachers received inservice training to improve instructional strategies.

One final alternative to reducing class size, that of using teacher aides, was examined through the research on Project STAR (Slavin, Karweit, & Wasik, 1991). It is true that the use of teacher aides can reduce pupil-to-adult ratios at half the cost of additional teachers. However, the available research on the achievement effects of adding paraprofessionals to elementary classes has generally found few if any effects on achievement (Slavin et al., 1991). One likely reason was that aides were reported as spending less than 25% of their time actually working with students. The rest of their time was spent on clerical activities and such custodial activities as supervising lunch or recess.

Aides primarily make teachers' jobs easier rather than serving an essential instructional function (Slavin et al., 1991).

Chapter IV

SUMMARY

As has been made apparent throughout this paper, a reduction in class size at the earliest grades offers significant advantages not only in achievement results, but also in other perhaps more important outcomes. The STAR results have held up in further research and are continuing to show added, continuous benefits (Nye, 1992). How much more evidence do policy makers need before they apply sound research results to improving schools? By applying the results, we would move from the current assembly-line schooling to case-load, information age learning activities. School is much more than improving test scores. As Cuban (1989) suggested, a class size of 15-20 students per teacher permits a level of personalizing instruction unavailable in more crowded settings. Building a sense of belonging to a group--a supportive environment--is consciously sought as a means of increasing self-esteem and achievement (Cuban, 1989). Small is definitely far better in the long run.

Quality education begins with a quality start. "Small classes provide quality (higher scores), equality (pupils are assigned at random and every child gets a smaller class), and equity (those who usually do less well get greater benefits)" (Achilles, Finn, & Bain 1997, p. 41). Although some people claim that class size is not important, data, logic, and common sense contradict their conclusion.

Might larger expenditures in the early grades pay off later in fewer dropouts, fewer retentions, and better-prepared entrants to the workforce? When teachers were asked what they would change in order to become more effective, they most often said that they "would decrease the number" of students in their classes (Bain & Achilles, 1986, p. 665). Significant reductions in class size touch virtually every student and teacher in the targeted grades.

Certainly research continues to be needed to help identify appropriate sizes, mixes, or organization of classes for achieving various purposes and outcomes of education. The debate should continue, as we still do not know all the answers to the class size questions (Pate-Bain, Achilles, Boyd-Zaharias, & McKenna, 1992). Future studies must also examine the longevity of effects of reducing class size in order to guard against the possibility of a Hawthorne Effect, novelty effect, or self-fulfilling prophecy. Any of these could occur as an outcome produced by the educators, parents, and students motivated by a state-wide effort to improve academic achievement through a popular program

such as class-size reduction (McGiverin, Gilman, & Tillitski, 1989). Efforts must be made to ascertain the kinds of training that teachers require to improve instruction in small classes.

Research on the relation of class size to student achievement should include important mediating variables such as intraclassroom organization, curricular objectives, teaching styles, and control of student and teacher variations. This would advance our understanding of important policy controllable factors that influence student achievement (Folger, 1990). Any decision concerning class size should be reached only after careful examination of numerous contributing variables. Results of research studies do not stand alone as conclusive evidence. The entire research process for each study must be reviewed for inadequacies in research design (South Carolina State Department of Education, 1980). As Johnston (1990) said, "Little is known about the long term effects on young children of beginning their school experience in a setting where their individual academic and personal needs are met by a teacher who believes they have the time to provide the kind of learning environment necessary for success in school" (p. 38).

REFERENCES

REFERENCES

Achilles, C. M., Finn, J. D., & Bain, H. P. (1997). Using class size to reduce the equity gap. Educational Leadership, 55(4), 40-43.

Bain, H. P. (1986). Small class size once again: An experiment in grade one, Metro-Nashville Public Schools. San Francisco, CA: American Educational Research Association. (ERIC Document Reproduction Service No. ED 271 196)

Bain, H. P., & Achilles, C. M. (1986, May). Interesting developments on class size. Phi Delta Kappan, 67, 662-665.

Bain, H. P., & Jacobs, R. (1990). The case for smaller classes and better teachers (Report No. ISSN-0735-0023). Alexandria, VA: National Association of Elementary School Principals. (ERIC Document Reproduction Service No. ED 322 632)

Blatchford, P., & Mortimore, P. (1994). The issue of class size for young children in schools: what can we learn from research? Oxford Review of Education, 20(4), 411-428.

Bossert, S. T., & Barnett, B. G. (1981, January). Grouping for instruction: A catalog of arrangements (Contract No. 400-03-0003). Far West Laboratory for Educational Research and Development.

Bourke, S. (1986). How smaller is better: Some relationships between class size, teaching practices, and student achievement. American Educational Research Journal, 23(4), 558-571.

Bracey, G. W. (1990, May). Small is beautiful. Phi Delta Kappan, 71(9), 731-732.

Bracey, G. W. (1995, September). Research oozes into practice: The case of class size. Phi Delta Kappan, 77(1), 89.

Chandler, T. A. (1989). Redistributing work to shrink class size. The Education Digest, LIV(6), 44-45.

Cuban, L. (1989, February). At-risk students: What teachers and principals can do. Educational Leadership, pp. 29-32.

Evertson, C. M., & Randolph, C. H. (1990). Teaching practices and class size: A new look at an old issue. Peabody Journal of Education, 67, 85-105.

Filby, N. (1980). What happens in smaller classes? A summary report of a field study. Class size and instruction project. San Francisco, CA: Far West Laboratory for Educational Research and Development. (ERIC Document Reproduction Service No. ED 219 365)

Filby, N., Cahen, L., McCutcheon, G., & Kyle, D. (1980). What happens in smaller classes? Far West Laboratory for Educational Research & Development.

Folger, J. (1989). Three policy relevant findings from Project STAR. San Francisco, CA. (ERIC Document Reproduction Service No. ED 307 696)

Folger, J. (1990). Lessons for class size policy and research. Peabody Journal of Education, 67, 123-132.

Gilman, D. A. (1988). Prime Time in the first grade at the North Gibson School Corporation: The first four years. A longitudinal evaluation of Indiana's state-supported reduced class size program. Indiana State University. (ERIC Document Reproduction Service No. ED 310 886)

Glass, G. V. (1980). On criticism of our class size/student achievement research: No points conceded. Phi Delta Kappan, 62, 242-244.

Glass, G. V., & Smith, M. L. (1979). Meta-analysis of research on class size and achievement. Educational Evaluation and Policy Analysis, 1(1), 2-16.

Gullo, D. F., & Burton, C. B. (1993). The effects of social class, class size and prekindergarten experience on early school adjustment. Early Child Development and Care, 88, 43-51.

Hawkinson, H. (1984, November). Hatch school--not at risk. Phi Delta Kappan, 66(3), 181-182.

Helmich, E., & Wasem, L. (1985). Class sizes for kindergarten and primary grades: A review of the research. Springfield, IL: Illinois State Board of Education, Springfield, Department of Planning, Research and Evaluation. (ERIC Document Reproduction Service No. ED 260 827)

Jacobs, R. (1987). The effect of class sizes of 1:15, 1:25, and 1:25 plus full-time aide on kindergarten reading readiness achievement. Dissertations/Theses--Doctoral Dissertations, 41, 1-186. (University Microfiche No. ED 326 863)

Johnston, J. M. (1990a). Effects of class size on classroom processes and teacher behaviors in kindergarten through third grade. (ERIC Document Reproduction Service No. ED 321 848)

Johnston, J. M. (1990b). Relations between reduced class size and reduced teacher/pupil ratio and developmentally appropriate practice in kindergarten through third grades. Boston, MA: American Educational Research Association. (ERIC Document Reproduction Service No. ED 317 278)

Klein, K. (1985, April). Practical applications of research: The research on class size. Phi Delta Kappan, 66(8), 578-580.

McGiverin, J., Gilman, D., & Tillitski, C. (1989). A meta-analysis of the relation between class size and achievement. The Elementary School Journal, 90(1), 47-56.

McIntyre, W. G., & Marion, S. F. (1989). The relationship of class size to student achievement: What the research says. Orono, ME: Maine University, Orono College of Education. (ERIC Document Reproduction Service No. ED 323 643)

McKenna, B. H. (1977). Class size: Some philosophical, organizational, and definitional considerations (NEA Stack No. 1503-7-00). Washington, DC: National Education Association.

Mitchell, D. (1989). How changing class size affects classrooms and students. California Educational Research Cooperative, Riverside. (ERIC Document Reproduction Service No. ED 315 841)

Mitchell, D. E., & Beach, S. A. (1990). How changing class size affects classrooms and students. Policy briefs number 12. San Francisco, CA: Far West Laboratory for Educational Research and Development. (ERIC Document Reproduction Service No. ED 358 077)

Mosle, S. (1996, June 17). What we talk about when we talk about education. The New Republic, pp. 34-35.

Mosle, S. (1996, November 11). Size matters. The New Republic, p. 38.

Mosteller, F. (1995). The Tennessee study of class size in the early school grades. The Future of Children, 5(2), 113-127.

Mueller, E. H. (1985, March). The Oak Park Plan: The fourth "R" (rescheduling). Unpublished manuscript.

Nye, B. A. (1992). Small is far better. A report on three class-size initiatives: Tennessee's student teacher achievement ratio (STAR) project, lasting benefits study, and Project CHALLENGE as a policy application (Paper No. 5). Nashville, TN: Center for Research in Basic Skills, Tennessee State University. (ERIC Document Reproduction Service No. ED 354 091)

Pate-Bain, H., Achilles, C. M., Boyd-Zaharias, J., & McKenna, B. (1992, November). Class size does make a difference. Phi Delta Kappan, 74(15), 253-256.

Ryan, D. W., & Greenfield, T. B. (1975). The class size question: Development of research studies related to the effects of class size, pupil/adult, and pupil/teacher ratios. Toronto, Canada: The Ministry of Education, Ontario.

Sabrio, L., Pechman, E., & Rubin, M. (1982). Reduced class size: The effect on achievement of high need first graders. New Orleans, LA: The Department of Testing and Evaluation.

Slavin, R. E., Karweit, N. L., & Wasik, B. A. (1991). Preventing early school failures: What works (Report No. 26). Baltimore, Maryland: The Johns Hopkins University, Center For Research On Effective Schooling for Disadvantaged Students.

Smith, M. L., & Glass, G. V. (1980, March). The effect of class size on what happens in classrooms. The Education Digest, pp. 16-18

Smith, M. L., & Glass, G. V. (1980). Meta-analysis of research on class size and its relationship to attitudes and instruction. American Educational Research Journal, 17(4), 419-433.

South Carolina State Department of Education. (1980). The effects of class size on student achievement: A review of the literature. Columbia, South Carolina: Author. (ERIC Document Reproduction Service No. ED 202 136)

Tomlinson, T. M. (1988). Class size and public policy: Politics and panaceas (Report No. PIP-88-838). Washington, DC: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED 292 216)

Vanble, M. E., & Gilman, D. A. (1988). A study of the relationship between class size and achievement. Indiana State University. (ERIC Document Reproduction Service No. ED 291 527)

Word, E. (1990). Student/teacher achievement ratio (STAR) Tennessee's K-3 class size study. Final summary report 1985-1990. Tennessee State Department of Education. (ERIC Document Reproduction Service No. ED 320 692)

Wright, E. N., Shapson, S. M., Eason, G., & Fitzgerald, J. (1977). Effects of class size in the junior grades. Toronto, Canada: The Ministry of Education, Ontario.

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Chairperson

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